

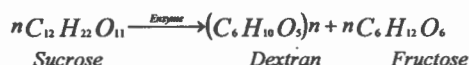
## Dextran and fructose production using *Leuconostoc mesenteroides* NRRL.B512(F) with sucrose as substrate

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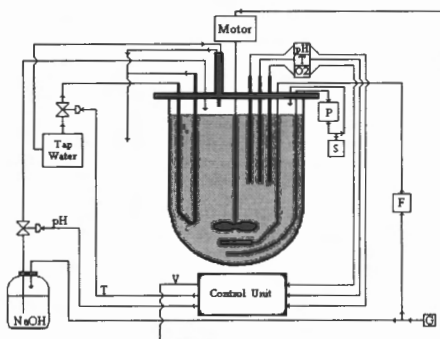
Dextran and fructose have many industrial applications. Dextran is widely used as a blood volume expander, in food industry and as a chromatographic media. Fructose is a low caloric sugar.

The strain *Leuconostoc mesenteroides* NRRL-B512(F) grows on sucrose-rich media which induces the production of an extracellular enzyme: dextranucrase. This enzyme also uses sucrose as a substrate to produce dextran and fructose as follows:



In this work we used a 2 litre Bioreactor (Setric Genie SET02, Incheltec, France) with control units for temperature, pH and agitation. We have studied the strain growth and product concentrations for various operation conditions. Fermentations were carried out for sucrose concentration in the range 20 - 40 g/L, temperatures of 25, 27.5 and 30° C (in the region of optimum growth), pH of 6.9 (optimum pH for strain growth) and 5.5 (for minimising loss of enzyme activity) and aeration at 0.05 vvm.

Figure 1 shows the experimental set-up used in this study. Figure 2 shows an example of a fermentation run.

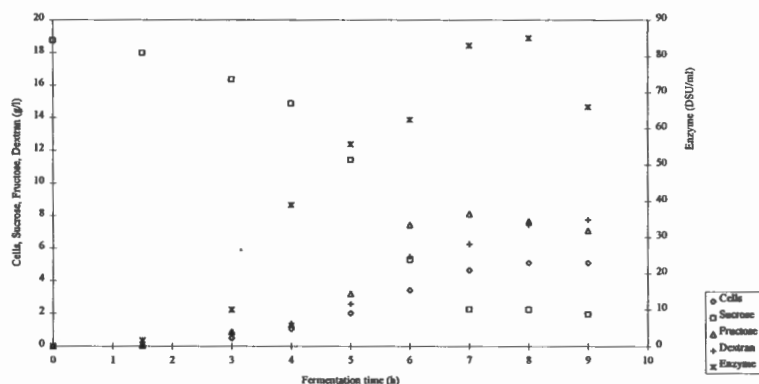


**Figure 1.** Schematic diagram of the bioreactor.

Key: P - peristaltic pump, S - Sample, F - gas filter,  
G - gas, T - temperature, V - velocity (rpm).

Temperature does not much affect cell growth but the enzyme activity decreases at higher temperatures. Runs at 25° C and pH=6.7 lead to higher cell growth than with pH=5.5. However, at

lower pH values (5.5) dextransucrase production is higher and the decrease in enzymatic activity is slower. Cellular growth and product formation were not affected by aeration.



**Figure 2.** Example of a fermentation. Medium: Sucrose 20g/L, yeast extract 20g/L,  $\text{NaH}_2\text{PO}_4$  8g/L; pH maintained at 5.5 throughout fermentation with 4M NaOH; temperature: 25°C; agitation: 150 rpm; no aeration.